

THE UNIVERD SHAYES OF AMERICA

TO ALL TO WHOM THESE PRESENTS; SHALL COME:

MestBred TIG

PLOTENS, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT. THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TILLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY THAT SHOW THIS DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC TEPTHINSTMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE SUBJECT OR EXCLUDE OTHERS FROM SELLING THE VARIETY OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR CONTINGIT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT ED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT. COMMON

'Rush'

In Costimum Macros, I have hereunto set my hand and caused the seal of the Hunt Huristy Frotection Office to be affixed at the City of Washington, D.C. this twenty-fifth day of January, in the year two thousand and soven.

Attest.

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Commissioner

Plant Variety Protection Office Agricultural Murketing Service of Agriculture

"Rush"Hard Red Spring Wheat

Exhibit A. Origin and Breeding History

Rush (CA-902-701) is a hard red spring wheat derived from the cross "Keystone" x "Granite". The cross was made in the fall of 2000 in a growth chamber and F₁, F₂ and F₃ seed generations were advanced in growth chambers with selection for agronomic (height, stem strength, self-fertility) and seed (hard vitreous) characteristics. The F₃ seed was planted as a bulk in Casselton, ND in the spring of 2001. Individual F₃ plants were evaluated for agronomic characteristics and general disease reactions. These plant selections were advanced to the F₄ in growth chambers and F₄ head rows (F₅ seed) were planted in Yuma, AZ in November 2001. Rush is derived from a single F₅ plant selection from that nursery. The F₆ seed were planted as a single 5' x 20' plot in Casselton, ND in the spring of 2002, where it was evaluated for maturity, height, straw strength, and resistance to foliar disease, stem rust, leaf rust and Fusarium head blight (scab) and harvested as an F₇ bulk and given the experimental designation CA-902-701. The F₇ bulk was increased and evaluated in Yuma, AZ in 2002-2003 and the F₈ bulk was planted and evaluated as a 1/5 acre increase in Casselton, ND in spring of 2003. The resulting F₉ was increased as Breeder Seed on 5 acres in Fisher, MN in the spring of 2004. About 320 bushels of Breeders Seed was planted on 160 acres in Fisher, MN in the spring of 2005 as an initial Foundation Seed increase. About 6000 bushels of Foundation Seed was harvested in August 2005 and CA-902-701 was named Rush. The Foundation seed was planted in the spring of 2006 to produce Registered and Certified class seed. The first unencumbered sales of Rush will be in the spring of 2007.

Rush was tested throughout North Dakota, Minnesota, and South Dakota in the Uniform Regional Nursery (Tables 1-6) in 2004 and Wheat Quality Council Trials in 2005 (Tables 7-8 and Figure 1). It was tested extensively in regional and company trials from 2003 to 2005 (Table 9). Rush is a hard red spring wheat bred by WestBred LLC and adapted to North Dakota, Minnesota and South Dakota. Rush is a semi-dwarf with early maturity, high test weight seed, very strong straw strength, high protein levels and satisfactory baking quality.

Rush has been observed for five generations of increase and testing and is uniform and stable. Rush is a semi-dwarf and variants 10-15 cm taller than the variety may appear at a frequency of 0.5% in Foundation seed production fields and up to 1.0% may be observed in subsequent generations. Rush will be purified as head rows on a regular basis.

Table 1. Mean agronomic data reported for 14 north central locations of the 2004 Hard Red Spring

Wheat Uniform Regional Nursery.

Line IAc Lb/Bu from 6-1 cm 0 to 9² % SD3687 75.5 58.5 24.2 92.1 0.9 14.1 MN01311-A 70.3 60.3 25.4 89.2 4.2 14.8 98S0127-06 69.8 59.7 26.1 81.2 0.2 13.9 SD3618 69.5 60.4 25.3 94.4 2.2 14.2 Verde 69.5 59.3 27.6 85.5 1.4 14.3 97S0264-8-1 68.9 56.4 29.0 83.4 0.9 14.9 MN9438-6 68.3 60.1 23.9 83.5 1.0 15.0 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3655 67.6 60.0 24.5 95.7 2.5 13.6 9650404-03 67.4 59.6 25.1	TTITOUT CITITOTIST	Yield Bu	Test wt.	Heading days	Height	Lodging	Protein
MN01311-A 70.3 60.3 25.4 89.2 4.2 14.8 98S0127-06 69.8 59.7 26.1 81.2 0.2 13.9 SD3618 69.5 60.4 25.3 94.4 2.2 14.2 Verde 69.5 59.3 27.6 85.5 1.4 14.3 97S0264-8-1 68.9 58.4 29.0 83.4 0.9 14.9 MN99436-6 68.3 60.1 23.9 83.5 1.0 15.0 SD3746 68.3 57.7 25.9 89.9 2.0 13.8 MN01197 68.2 58.0 29.0 86.4 1.9 13.9 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 23.75 66.5 60.3 24.6 89.7 2.6 14.5 SW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 ND SW0347 64.5 59.3 26.0 86.9 0.6 14.9 ND 5747 64.3 61.8 23.9 92.6 0.8 15.4 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 ND SW0247 64.5 59.3 26.0 86.9 0.6 14.9 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 ND SW0247 64.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.9 61.4 23.8 84.5 0.4 11.3 14.8 ND SW0247 56.6 55.5 58.0 29.7 102.4 3.0 14.6 ES63 55.1 56.6 24.5 82.1 2.0 14.5 ES63 55.1 56.6	Line					0 to 92	
98S0127-06 69.8 59.7 26.1 81.2 0.2 13.9 SD3618 69.5 60.4 25.3 94.4 2.2 14.2 Verde 69.5 59.3 27.6 85.5 1.4 14.3 97S0254-8-1 68.9 58.4 29.0 83.4 0.9 14.9 MN99436-6 68.3 60.1 23.9 83.5 1.0 15.0 SD3746 68.3 57.7 25.9 89.9 2.0 13.8 MN01197 68.2 58.0 29.0 86.4 1.9 13.9 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.	SD3687	75.5	58.5	24.2	92.1	0.9	14.1
SD3618	MN01311-A	70.3	60.3	25.4	89.2	4.2	14.8
Verde 69.5 59.3 27.6 85.5 1.4 14.3 97S0254-8-1 68.9 58.4 29.0 83.4 0.9 14.9 MN99436-6 68.3 57.7 25.9 89.9 2.0 13.8 MN01197 68.2 58.0 29.0 86.4 1.9 13.9 ND 800 67.6 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 59.6 25.1 77.1 1.3 14.3 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 80228 66.3 59.3 32.5<	98S0127-06	69.8	59.7	26.1	81.2	0.2	13.9
97S0254-8-1 68.9 58.4 29.0 83.4 0.9 14.9 MM99436-6 68.3 60.1 23.9 83.5 1.0 15.0 SD3746 68.3 57.7 25.9 89.9 2.0 13.8 MN01197 68.2 58.0 29.0 86.4 1.9 13.9 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 751 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.6 28.3 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 ND 8W0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 ND 741 61.4 60.3 26.8 92.6 0.8 15.4 ND 741 61.4 60.3 26.8 97.8 2.4 15.1 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 ND 741 61.4 60.3 26.8 97.8 2.4 15.1 ND SW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 94.3 1.0 13.5 Keene 60.0 59.3 26.0 86.1 13.3 14.8 ND SW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 94.3 1.0 13.5 Keene 60.0 59.3 26.0 27.4 86.1 1.3 14.8 ND SW0345 55.5 56.0 29.7 102.4 3.0 14.5 ND SW0346 55.5 56.0 24.7 93.2 19.9 14.1 ND SW0345 55.5 56.0 29.7 102.4 3.0 14.3 ND SW0345 55.5 56.0 29.7 102.4 3.0 14.5 ND SW0345 55.5 56.0 29.7 102.4 3.0 14.6 ND SW0345 55.5 56.0 29.7 102.4 3.0 14.5 ND SW0345 55.5 56.0 29.7 102.4 3.0 14.6 ND SW0345 55.5 56.0 2	SD3618	69.5	60.4	25.3	94.4	2.2	14.2
MN99436-6 68.3 57.7 25.9 89.9 2.0 13.8 MN01197 68.2 58.0 29.0 86.4 1.9 13.9 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 SD3635 66.5 60.3 24.6 89.7 2.6 14.5 SD8828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 ND SW0347 64.5 59.3 26.0 86.9 0.6 14.9 NN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 ND 99-0241 64.0 58.7 28.3 85.0 0.6 14.6 SD3668 14.9 SD3644 60.0 58.7 28.3 85.0 0.6 14.6 SD3644 16.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 50.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 50.2 25.8 99.7 10.2 15.1 NDSW0217 61.4 50.2 25.8 99.9 2.6 0.8 15.4 NDSW0217 61.4 50.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 50.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 50.2 25.8 97.8 24.1 15.1 NDSW0345 55.5 58.0 29.7 10.2 4.7 93.2 19.9 14.1 NDSW0345 55.5 58.0 29.7 10.2 4.7 93.2 19.9 14.1 NDSW0345 55.5 58.0 29.7 10.2 4.7 93.2 19.9 14.1 NDSW0217 61.4 50.2 25.8 57.5 98.6 3.0 12.6 CA-902-701 60.8 61.4 50.2 25.8 3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 10.4 1.9 15.0 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 NDSW0345 55.5 58.0 29.7 10.2 4.3 14.7 NDSW0345 55.5 58.0 29.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 58.0 29.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 58.0 29.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.5 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.5 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.5 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.5 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 87.7 10.2 4.3 0.1 14.6 NDSW0345 55.5 56.0 24.6 88.7 19.9 2.4 14.4 NDSW0345 55.5 56.0 24.6 88.7 19.9 2.4 14.4 NDSW0345 55.5 56	Verde	69.5	59.3	27.6	85.5	1.4	14.3
SD3746 68.3 57.7 25.9 89.9 2.0 13.8 MN01197 68.2 58.0 29.0 86.4 1.9 13.9 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 747 66.5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9	97S0254-8-1	68.9	58.4	29.0	83.4	0.9	14.9
MN01197 68.2 58.0 29.0 86.4 1.9 13.9 SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 28.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 2375 66.5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9 1.2 16.0 MND751 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.6 59.7 26.6 86.0 0.4 14.4 SB3668 65.0 60.2 23.0 94.2	MN99436-6	68.3	60.1	23.9	83.5	1.0	15.0
SD3747 68.1 57.8 23.5 83.0 0.7 13.8 ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 ND 751 66.5 60.3 59.3 32.5 89.9 1.2 16.0 MN02261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 ND 747 64.3 60.1 23.6	SD3746	68.3	57.7	25.9	89.9	2.0	
ND 800 67.6 60.4 26.0 91.7 2.4 15.1 SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 2375 66.5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 ND 80347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 NDSW0217 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-80W 59.8 60.5 23.5 98.7 34. 15.1 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 34. 15.2 ES63 55.1 56.6 28.7 99.9 24.7 30.0 14.6 BW346 55.3 58.3 27.0 98.7 34. 15.2 ES63 55.1 56.6 28.7 99.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 34. 15.2 ES63 55.1 56.6 28.7 99.9 24.7 93.2 1.9 14.1 MT 0249 52.2 56.6 28.7 99.9 2.3 14.6 BW346 55.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 38 14.2 UMan 10.5 15.5 Marquis 44.9 57.7 27.9 108.5 38 14.2 UMan 10.5 15.1 Wann 10.5 15.1	MN01197	68.2	58.0	29.0	86.4	1.9	13.9
SD3635 67.6 60.0 24.5 95.7 2.5 13.6 96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 2375 66.5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 <td>SD3747</td> <td>68.1</td> <td>57.8</td> <td>23.5</td> <td>83.0</td> <td>0.7</td> <td>13.8</td>	SD3747	68.1	57.8	23.5	83.0	0.7	13.8
96S0404-03 67.4 59.6 25.1 77.1 1.3 14.3 ND 801 67.4 61.4 25.2 92.1 2.1 15.4 ND 741 67.0 60.5 26.0 91.0 2.2 15.4 2375 66.5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 36.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND-47 64.3 61.8 23.9 92.6 <td>ND 800</td> <td>67.6</td> <td>60.4</td> <td>26.0</td> <td>91.7</td> <td>2.4</td> <td>15.1</td>	ND 800	67.6	60.4	26.0	91.7	2.4	15.1
ND 801	SD3635	67.6	60.0	24.5	95.7	2.5	13.6
ND 741 67.0 60.5 26.0 91.0 2.2 15.4 2375 66.5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 59.2 25.4 98.6 3.0 12.6 CA-901-580W 59.8 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 24.4 15.1 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.9 CV % 9.2 1.7 2.8 4.3 4.3 44.3 2.7	96\$0404-03	67.4	59.6	25.1	77.1	1.3	14.3
2375 66,5 60.3 24.6 89.7 2.6 14.5 BW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N89-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 59.2 25.4 98.6<	ND 801	67.4	61.4	25.2	92.1	2.1	15.4
BW828 66.3 59.3 32.5 89.9 1.2 16.0 MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98	ND 741	67.0	60.5	26.0	91.0	2.2	15.4
MN00261-4 65.8 60.6 28.3 86.0 2.1 14.9 ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 35.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8	2375	66.5	60.3	24.6	89.7	2.6	14.5
ND 751 65.8 60.8 27.5 95.4 2.9 15.4 98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 <	BW828	66.3	59.3	32.5	89.9	1.2	16.0
98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 <t< td=""><td>MN00261-4</td><td>65.8</td><td>60.6</td><td>28.3</td><td>86.0</td><td>2.1</td><td>14.9</td></t<>	MN00261-4	65.8	60.6	28.3	86.0	2.1	14.9
98S0051-1 65.6 59.7 26.6 86.0 0.4 14.4 SD3668 65.0 60.2 23.0 94.2 4.3 14.7 NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 <t< td=""><td>ND 751</td><td>65.8</td><td>60.8</td><td>27.5</td><td>95.4</td><td>2.9</td><td>15.4</td></t<>	ND 751	65.8	60.8	27.5	95.4	2.9	15.4
NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7	98S0051-1		59.7	26.6	86.0	0.4	14.4
NDSW0347 64.5 59.3 26.0 86.9 0.6 14.9 MN01333-A 64.3 60.1 23.6 80.2 0.3 14.7 ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7	SD3668	65.0	60.2	23.0	94.2	4.3	14.7
ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7	NDSW0347		59.3	26.0	86.9	0.6	14.9
ND 747 64.3 61.8 23.9 92.6 0.8 15.4 N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7	MN01333-A	64.3	60.1	23.6	80.2	0.3	14.7
N99-0241 64.0 58.7 28.3 85.0 0.6 14.6 BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7	ND 747	64.3	61.8	23.9	92.6	0.8	15.4
BZ 998-447W 62.6 55.6 24.6 87.1 1.6 14.2 BW341 61.4 60.3 26.8 97.8 2.4 15.1 NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 <td< td=""><td></td><td></td><td></td><td>28.3</td><td>85.0</td><td>0.6</td><td>14.6</td></td<>				28.3	85.0	0.6	14.6
NDSW0217 61.4 59.2 25.4 98.6 3.0 12.6 CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106	BZ 998-447W	62.6	55.6	24.6	87.1	1.6	14.2
CA-902-701 60.8 61.4 23.8 84.5 0.4 15.1 WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108	BW341	61.4	60.3	26.8	97.8	2.4	15.1
WA007931 60.3 57.5 28.3 94.3 1.0 13.5 Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 <td>NDSW0217</td> <td>61.4</td> <td>59.2</td> <td>25.4</td> <td>98.6</td> <td>3.0</td> <td>12.6</td>	NDSW0217	61. 4	59.2	25.4	98.6	3.0	12.6
Keene 60.0 59.3 26.3 104.4 1.9 15.0 CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3	CA-902-701	60.8	61.4	23.8	84.5	0.4	15.1
CA-901-580W 59.8 60.5 23.5 96.6 3.0 14.3 WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	WA007931	60.3	57.5	28.3	94.3	1.0	13.5
WA007925 59.2 58.7 24.7 93.2 1.9 14.1 MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	Keene	60.0	59.3	26.3	104.4	1.9	15.0
MT 0245 57.5 56.9 27.4 86.1 1.3 14.8 NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	CA-901-580W		60.5	23.5	96.6	3.0	14.3
NDSW0345 55.5 58.0 29.7 102.4 3.0 14.6 BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	WA007925	59.2	58.7	24.7	93.2	1.9	14.1
BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	MT 0245	57.5	56.9	27.4	86.1	1.3	14.8
BW346 55.3 58.3 27.0 98.7 3.4 15.2 ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	NDSW0345	55.5	58.0	29.7	102.4	3.0	14.6
ES63 55.1 56.6 28.7 91.9 2.4 14.4 MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	BW346		58.3	27.0	98.7	3.4	15.2
MT 0249 52.2 56.6 24.5 82.1 2.0 14.5 Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7					91.9	2.4	14.4
Chris 45.3 57.7 27.5 106.3 5.9 15.3 Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7			56.6	24.5	82.1	2.0	14.5
Marquis 44.9 57.7 27.9 108.5 3.8 14.2 Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7							15.3
Mean 63.4 59.2 26.0 90.9 2.3 14.6 LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7							
LSD 0.05 9.0 1.5 1.4 5.3 1.6 0.6 CV % 9.2 1.7 2.8 4.3 44.3 2.7	 		·····				
CV % 9.2 1.7 2.8 4.3 44.3 2.7				•			
14 14 15 15 TO 0	No. Sites	14	14	13	14	6	9

¹Locations are Crookston, Morris and St. Paul, MN; Carrington, Hettinger, Williston, Langdon, Minot, and Prosper, ND; Brookings, Groton and Selby, SD; Sidney, MT; and Glenlea, MB. ²Lodging scored 0 (least) to 9 (highest).

Table 2. 2004 Hard Red Spring Wheat Uniform Regional Nursery Seedling Leaf Rust Reactions, St. Paul, MN. (From Dr. Jim Kolmer, USDA-ARS)¹.

	-				Race 9-				MCDS
Line	THBJ	MJBJ	MCDS	TLGF	SBD	KFBJ	TDBJ	MBRJ	(repeat)
Marquis*	3+	33+	4	;1-/3+	33+	3+	3+	3+	2+3
Chris	_	33+	33+	;1	33+	3+	3+	4	3+
2375	;2	23	23	23	. ;	0;/3+	2-	3-	2+3+
Verde	;1-	33+	;1-	;	:	:	-	-	
Keene	;1-	0;1-	0;	;1-		;1-	1+	,	0;
SD3618	-	0;	0;	;1-	,		·		0;
SD3635	;2-	0;	0;	;1-				;2	
SD3668	;2	;1-2-	0;	;	;	0;	1	0;2-	0;
SD3687	;1-	0;	0;	;1-	0;		į	;1-	0;
SD3746	0;	0;	0;	;1	0;		0;	0;	0;
SD3747	;	0;	0;	;	0;	0;	0;	0;	-
BZ998-447W	-	1+	;	;1-	0;	33-	3+	33+	0;
CA-902-701	0;	0;	Ó;	0;	0;	0;	0;	0;	0;
CA-901-580W	0;	0;	0;	0;	0;	0;	0;	0;	0;
N990241	2	22-	0;	0;	0;	•	:	;2	•
96S0404-03	;1-	0;	0;	_	0;	:		0;	0;
98\$0051-1	22+	;2-	;2-	0;	:	;1 .	•	;1	;1-
98S0127-06	3-	2-	;1-	0;	O;	:	;	;12-	;1-
97S0254-8-1	0;	23	0;	0;	0;	:	:	0;	-
NDSW0217	4	33+	0;	3;	0;	3+	3+	3+	•
NDSW0345	4	0;	0;	;	;3	3+	3+	;3+	0;
NDSW0347	4	0;		;3	:	;1	12+	;3+	;
BW341	;1-	:1-	0;1-	;1-	:	:	0;	0;	;1-
BW346	4	33+	23;c	;2-	0;	;1-	;12	2+3	1+
ES63**	3+	3+	0;	33-	3+	0;1-	33+	4	;12-
MN99436-6	;1-		0;	;	0;	;1-	;1-	;22+	-
MN00261-4	2-	33-	0;	0;	:	;1-	-	1	_
MN01197	23	0;	0;	:	:	-	-	0;	;
MN01311-A	2	;2	0;	O;	0;	-	;	;12-	;
MN01333-A	;1-	;1-	0;	;	0;	;	;		0;
BW828	23-	:	0;	O;	0;	0,	:	0;	0;
WA007925	3	0;	0;	-,	0;	3	33+	0;/1	_
WA007931	_		-	-	;1-	3	_	33+	-
MT0245	3+	0;	0;	0;	;2=	33+	3+	3+	0;
MT0249	3+	0;	0;	0;	33+	33+	3+	0;	0;
ND741	;2=	0;	0;	0;	:	:	0;	0;	_
ND747	;1-	0;	0;	<u>0;</u>	, 0;	•	0;	;1-	0;
ND751		-	0;	0;	0;	_	0;	0;	0;
ND800		0;	0;	0;1-	0;	•	0;	0;	0;
ND801	,	0;	0;	0;	0;	, ,	-,	0;	<u>0;</u> 0;

^{*} Marquis through BW346 evaluated in tray 1.

^{**} ES63 through ND801-A evaluated in tray 2.

¹Taken from Table 26 of the 2004 HRSW Uniform Regional Nursery.

Table 3. 2004 Hard Red Spring Wheat Uniform Regional Nursery, Glenlea, MB, Canada.¹

Line	Yield	Test Wt.	Maturity	Height	Lodging	1000 K Wt.	Leaf F	Rust
	Bu/Ac	Lb/Bu	days	cm	1-9	g	Severity	Pustle
SD3687	98.1	58.7	120	82	2	36.5	15	mrms
SD3635	92.2	61.8	126	86	3	34.2	35	mss
ND 800	89.9	62.5	128	78	2	33.5	0	r
ND 801	88.5	63.2	129	81	3	33.3	0	r
MN01311-A	87.3	61.5	122	77	5	37.8	0	r
MN99436-6	87.0	59.7	127	74	3	30.7	missing	
ND 751	86.9	62.9	128	83	3	33.6	5	mr
BW341	86.6	61.4	131	82	1	32.3	0	r
NDSW0347	86.3	61.1	127	77	1	31.4	0	r
SD3746	84.9	59.3	128	82	2	34.4	5	mr
SD3618	84.9	61.6	124	79	3	36.4	5	mr
MN00261-4	83.7	62.9	126	73	2	34.9	10	mrms
ES63	83.1	59.7	127	81	2	39.6	30	mrms
ND 741	82.4	61.5	126	80	2	32.4	5	mr
MN01197	82.1	58.1	130	78	2	32.1	5	mr
WA007931	81.8	61.3	131	85	1	34.8	0	r
Keene	81.3	61.9	125	88	1	31.2	5	mr
MT 0245	81.1	58.9	132	80	2	30.5	35	mrms
MN01333-A	79.7	61.0	119	67	1	34.4	0	r
BZ 998-447W	79.6	57.7	122	75	3	41.9	25	mrms
NDSW0217	79.2	60.1	119	84	3	33.2	45	mss
Verde	78.9	58.5	132	74	3	31.3	0	r
SD3747	78.8	58.3	127	74	1	32.5	0	r
MT 0249	78.6	59.8	124	73	3	30.0	55	mss
SD3668	77.8	59.8	123	81	4	33.5	20	mrms
98S0051-1	77.7	60.8	133	75	1	34.3	10	mr
WA007925	77.5	59.4	123	76	2	31.5	35	mrms
2375	75.8	59.9	124	74	3	37.0	0	r
ND 747	75.7	64.0	126	80	1	32.4	5	mr
96S0404-03	74.6	58.0	131	63	2	27.9	20	mrms
97S0254-8-1	74.3	57.3	132	71	2	31.5	0	٢
N99-0241	73.9	60.5	132	78	1	33.0	10	mr
BW828	73.3	59.0	120	81	. 3	33.9	15	mrms
CA-902-701	71,2	61.1	122	73		32.9	0	
BW346	70.2	58.7	119	82	3	33.7	35	mss
98S0127-06	70.1	58.0	133	73	1	26.0	5	mr
NDSW0345	68.3	60.8	130	86	2	36.5	5	mr
CA-901-580W	65.2	59.1	121	80	4	36.6	25	mrms
Chris	61.0	59.7	125	89	4	28.6	20	mrms
Marquis	56.1	58.8	123	98	4	31.4	35	mss
Mean	79.1	60.2	126.2	78.8	2.4	33.3		
LSD			3.7	4.7	1.1	1.7		
CV Taken from Table			1.8	3.7	29.1	3.1		

Taken from Table 19 of the 2004 HRSW Uniform Regional Nursery Report.

Table 4. 2004 Hard Red Spring Wheat Uniform Regional Nursery, Pullman, WA. ¹

Line	Yield	Test Wt.	Heading	Height	Protein	Stripe Rust	Stripe Rust
	Bu/Ac	Lb/Bu	d from 6-1	cm	%	% plants 0-90	Severity 0-8
BZ 998-447W	108.4	60.2	16	107	12.9	0	0
WA007925	91.3	63.5	17	112	12.1	2	2
WA007931	87.7	62.9	18	99	11.1	0	0
SD3635	86.9	61.1	16	107	12.0	20	6
MT 0249	86.6	62.4	16	94	13.4	0	0
ND 747	83.3	64.2	16	112	14.0	10	3
SD3687	83.1	59.3	15	104	12.3	20	3-5
Keene	81.2	62.7	19	124	12.5	10	2-3
CA-901-580W	81.1	62.2	15	112	12.2	20	3-5
ND 741	80.7	60.7	18	102	13.8	5	2,8
ND 801	79.2	62.9	18	107	12.8	5	2-3
MN01197	79.1	59.5	20	89	12.7	20	3
SD3668	76.3	61.6	15	109	12.5	20	3
MN99436-6	76.1	59.9	12	76	12.8	60	8
SD3746	75.8	59.2	17	91	11.9	20	6
MN01311-A	75.5	61.5	16	97	12.4	40	8
ND 751	74.4	62.8	18	104	12.9	5	5
ND 800	73.6	60.9	17	94	13.0	5	5
98S0127-06	73.0	60.7	17	81	12.9	20	6
SD3747	72.1	59.2	15	89	12.1	50	6-8
NDSW0347	71.5	62.1	18	86	12.1	5	2-3
98S0051-1	70.1	61.4	16	86	13.2	5	2
NDSW0345	69.5	62.5	20	109	12.8	· 2	2
NDSW0217	69.4	60.7	18	114	10.5	20	6-8
97S0254-8-1	68.9	61.5	19	86	13.1	20	3-5
SD3618	68.6	61.5	18	107	12.3	20	6
Marquis	68.4	61.1	20	124	13.4	2	2
MT 0245	68.4	60.1	18	94	12.6	20	3-5
2375	66.0	61.5	13	97	12.0	40	6-8
96S0404-03	64.6	61.7	14	76	11.9	40	5-6
Verde	64.2	60.5	18	86	12.1	20	3-5
Chris	62.4	60.7	20	124	13.1	2	2-3
MN01333-A	61.9	60.9	15	91	11.9	40	8
CA-902-701	61.1	62.8	15	102	12.6	40	6
N99-0241	55.4	59.9	19	86	12.0	50	6-8
MN00261-4	53.1	60.2	20	86	13.1	30	6-8
Mean	74.1	61.3	17.0	99.1	12.5		
IVICALI	/ 廿. 1	01.5	17.0	JJ. I	12.0		

¹Taken from Table 18 of the 2004 HRSW Uniform Regional Nursery Report.

Table 5. 2004 Hard Red Spring Wheat Uniform Regional Nursery, Carrington, ND.¹

Line	Yield	Test Wt.	Heading	Height	Lodging	Protein	Disease**	Rust
	Bu/Ac	Lb/Bu	days from 6-1	cm	0 to 9	%	% flag leaf	Type/Level
SD3687	75.7	59.1	33	104	2.0	13.9	33.3	Stripe
MN01311-A	70.0	61.0	33	94	2.3	14.5	19.0	Stripe
ND 751	67.5	61.8	34	102	2.3	15.1	23.3	None/Limited
97S0254-8-1	65.4	60.1	36	95	0.3	14.9	15.0	None/Limited
MN99436-6	64.5	59.6	32	88	0.7	15.0	8.3	None/Limited
ND 801	63.5	61.7	33	100	1.0	15.5	26.7	Stripe
ND 741	61.9	60.2	33	94	1.0	15.3	18.3	None/Limited
SD3618	61.8	59.0	33	105	3.3	14.8	26.7	None/Limited
N99-0241	61.0	58.3	36	88	0.7	13.9	48.3	Stripe/Leaf
96S0404-03	60.3	58.9	34	87	1.0	13.9	53.3	Stripe/Leaf
SD3746	60.1	56.3	34	93	0.7	13.6	35.0	None/Limited
SD3635	59.6	58.7	33	104	4.0	13.2	50.0	Stripe
MN01333-A	57.7	59.5	33	88	0.0	14.9	25.0	Stripe
Verde	57.7	5 7.7	35	90	1.0	14.1	16.7	None/Limited
SD3668	57.5	59.3	32	104	6.3	14.7	40.0	None/Limited
98\$0051-1	57.4	59.1	35	88	1.0	14.2	70.0	None/Limited
MN01197	56.1	57.4	36	91	1.7	13.4	23.3	None/Limited
ND 747	55.9	63.2	32	105	1.3	15.3	43.3	None/Limited
SD3747	54.7	54.5	33	91	1.7	13.9	51.7	Leaf
CA-901-580W	54.3	60.9	32	100	4.0	13.4	45.0	Stripe/Leaf
MN00261-4	53.8	60.2	36	92	1.0	14.4	40.0	Stripe/Leaf
ND 800	52.8	60.4	33	95	1.0	14.9	31.7	None/Limited
BW341	50.9	60.0	33	109	2.0	15.3	16.7	Stripe
CA-902-701	49.5	60.1	32	101	0.0	15.0	40.0	Stripe
2375	47.9	59.1	32	96	4.3	14.3	81.7	None/Limited
BZ 998-447W	47.7	52.5	33	94	2.3	14.2	50.0	None/Limited
NDSW0347	46.2	57.6	34	97	1.3	14.6	55.0	Leaf
98S0127-06	45.9	57.1	35	83	0.7	13.6	51.7	Leaf
NDSW0217	44.7	57.9	34	110	6.0	12.6	40.0	Stripe
Keene	43.8	58.4	34	114	2.0	14.9	5.0	Stripe
Reeder	40.0	56.5	34	99	1.7	14.5	60.0	Leaf
BW346	38.8	56.5	33	105	5.7	15.1	80.0	Leaf
MT 0245	37.4	55.8	35	93	2.0	14.8	75.0	Leaf
Marquis	36.0	58.4	39	117	5.7	14.6	45.0	Leaf
NDSW0345	35.7	59.0	38	111	6.7	13.6	33.3	None/Limited
WA007925	35.2	56.1	33	104	5.0	14.1	78.3	Leaf
ES63	33.0	53.9	36	98	4.0	13.8	65.0	Leaf
WA007931	31.4	54.5	36	98	5.0	14.0	76.7	Leaf
Chris	25.3	54.2	35	113	7.3	15.6	66.7	Leaf
MT 0249	21.3	53.0	34	88	7.0	15.0	90.0	Leaf
Mean	51.0	58.2	34.0	98.2	2.7	14.4	43.9	
LSD	9.1	1.2	1.2	3.2	1.6	0.6	17.6	
CV	11.0	1.2	1.1	5.0	36.7	2.4	24.7	
				· · · · · · · · · · · · · · · · · · ·			* -	

^{**} Leaf disease rating scored during late milk to early dough stage.

¹ Taken from Table 9 of the 2004 HRSW Uniform Regional Nursery Report.

Table 6. 2004 Hard Red Spring Wheat Uniform Regional Nursery Scab Report, 3 locations¹.

	Crooksto	n, MN	St. Paul,	MN	Prosper, ND	
Line	VSK %	Disease Index	VSK %	Disease Index	Disease Index	
Marquis	18	9	8	38	40.6	
Chris	16	26	8	67	37.8	
2375	23	46	6	73	38.1	
Verde	23	54	12	69	64.3	
Keene	18	39	8	63	60.3	
SD3618	25	24	6	18	12.3	
SD3635	18	32	6	68	25.1	
SD3668	30	29	8	31	23.4	
SD3687	23	14	4	51	14.7	
SD3746	45	48	15	89	21.7	
SD3747	40	52	10	44	31.2	
BZ 998-447W	30	64	15	79	60.1	
CA-902-701	20	35	6	64	12.9	
CA-901-580W	19	30	8	31	16.2	
N99-0241	30	47	20	71	50.3	
96S0404-03	28	67	25	89	52.2	
98S0051-1	30	34	8	38	50.0	
98S0127-06	18	46	15	82	22.7	
97S0254-8-1	10	47	10	65	57.2	
NDSW0217	13	47	4	80	70.3	
NDSW0217	13	45	8	68	70.3 49.7	
NDSW0347	15	45 29	2	50	21.6	
BW341	14		6		17.3	
BW346		33 8	4	56 68		
ES63	10 25	25	4 15	68 86	5.5 78.1	
MN99436-6	23	34	2	80	27.0	
MN00261-4	10	32	2	61	60.4	
MN01197	23	38	8	68	39.3	
MN01311-A	20	25	2	61	44.4	
MN01333-A	23	48	10	51 	24.5	
BW828	9	12	10	75		
WA007925	33	46	8	60	54.6	
WA007931	21	50	6	87	71.1	
MT 0245	25	51	15	68	65.0	
MT 0249	28	79	15	56	71.9	
ND 741	18	34	2	67	21.6	
ND 747	7	12	2	45	23.9	
ND 751	12	11	2	28	29.0	
ND 800	18	40	4	69	27.4	
ND 801	12	20	2	44	9.9	
Alsen (MR ck)	7	12	2	23	-	
BacUp (MR ck)	11	27	2	24	-	
Wheaton (sus ck)	45	81	35	79		
Mean	21.6	38.6	8.8	59.7	38.6	
LSD	11.3	19.2			-	
CV	26.4	25.2				

¹Taken from Tables 23, 24, 25 of the 2004 Hard Red Spring Wheat Uniform Regional Nursery.

Table 7. Summary of kernel characteristics of HRSW lines tested in the Wheat Quality Council Trials in 2004. Rush, CA-902-701, is entry C16, and K16.

Summary of Kernel Characteristics

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ID	Random			TW	Keme	el Size	Kemel Weight	Wheat Falling Number	Kernel Hardness	Vitreous Kemels
WGC 01		Entry	ID .		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	····	, -	-		
WQC 02 CA-902-701 C18 58.3 48 7 27.1 344 68.0 20.5 WQC 03 ND800 B15 61.0 70 4 30.8 438 90.3 80.9 WQC 04 ND800 K15 59.9 75 3 31.9 380 105.8 38.7 WQC 06 ND800 M15 62.0 67 4 31.5 405 96.0 90.0 WQC 07 96S0113-20 M12 61.4 58 5 30.1 402 79.7 87.3 WQC 09 98S0113-20 K12 58.0 63 5 30.0 342 88.5 43.9 WQC 019 98S0113-20 B12 61.4 71 3 31.4 413 88.7 44.9 WQC 011 COI320W K11 52.2 19 25 19.0 316 70.9 7.5 WQC 012 COI320W K11 52.2 19 25 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>***</td> <td></td> <td></td> <td></td>							***			
WGC 04 ND800 C15 57.5 56 7 27.7 402 93.8 24.5 WGC 05 ND800 K15 59.9 75 3 31.9 360 105.8 38.7 WGC 07 9850113-20 M12 61.4 58 5 30.1 402 79.7 87.3 WGC 08 9850113-20 K12 58.0 63 5 30.0 342 68.5 43.9 WGC 09 9850113-20 K12 58.1 53 8 26.6 386 75.9 11.7 WGC 010 9850113-20 B12 61.4 71 3 31.4 413 89.7 44.9 WGC 011 COI320W K11 56.6 66 4 28.8 209 60.8 27.6 WGC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WGC 015 ND805 M10 62.4 77 3 <td>WQC 02</td> <td>CA-902-701</td> <td>C16</td> <td>58.3</td> <td>48</td> <td>7</td> <td>27.1</td> <td></td> <td></td> <td></td>	WQC 02	CA-902-701	C16	58.3	48	7	27.1			
WQC 05 ND800 K15 59.9 75 3 31.9 380 105.8 38.7 WQC 06 ND800 M15 62.0 67 4 31.5 405 96.0 90.0 WQC 07 9850113-20 K12 58.0 63 5 30.0 342 88.5 43.9 WQC 09 9850113-20 C12 59.1 53 8 26.6 388 75.9 11.7 WQC 010 9850113-20 B12 61.4 71 3 31.4 413 89.7 44.9 WQC 011 COI320W K11 56.6 66 4 29.8 209 60.8 27.6 WQC 012 COI320W K11 56.6 66 4 29.8 293 60.8 29.4 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 014 ND805 M10 62.4 77 3	WQC 03	ND800	B15	61.0	70	4	30.8	438	90.3	80.9
WQC 06 ND800 M15 62.0 67 4 31.5 405 96.0 90.0 WQC 07 98S0113-20 M12 61.4 58 5 30.1 402 79.7 87.3 WQC 09 98S0113-20 K12 58.1 53 8 26.6 388 75.9 11.7 WQC 09 98S0113-20 B12 61.4 71 3 31.4 413 88.7 59.9 11.7 WQC 011 COI320W C11 52.2 19 25 19.0 316 70.9 7.5 WQC 012 COI320W K11 56.6 66 4 28.8 209 60.8 27.6 WQC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 016 MN00261-4 K9 61.1 85	WQC 04	ND800	C15	57.5	56	7	27.7	402	93.8	24.5
WQC 07 98S0113-20 M12 61.4 58 5 30.1 402 79.7 87.3 WQC 08 98S0113-20 K12 58.0 63 5 30.0 342 88.5 43.9 WQC 09 98S0113-20 C12 58.1 53 8 26.6 388 75.9 11.7 WQC 010 98S0113-20 B12 61.4 71 3 31.4 413 89.7 44.9 WQC 011 C91320W C11 52.2 19 25 19.0 316 70.9 7.5 WQC 013 C01320W K11 56.6 66 4 28.8 209 60.8 27.6 WQC 013 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 018 MN00261-4 K9 59.0 57			K15	59.9	75	3	31.9	360	105.8	38.7
WQC 08 98S0113-20 K12 58.0 63 5 30.0 342 88.5 43.9 WQC 09 98S0113-20 C12 58.1 53 8 26.6 388 75.9 11.7 WQC 010 98S0113-20 B12 61.4 71 3 31.4 413 89.7 44.9 WQC 011 COIS20W C11 52.2 19 25 19.0 316 70.9 7.5 WQC 013 COIS20W K11 56.6 66 4 29.8 296 60.8 27.6 WQC 013 COIS20W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 015 ND805 M10 62.4 77 3 35.2 366 89.1 98.5 WQC 015 ND805 K10 57.4 64 6 30.1 385 99.9 4.7 WQC 017 MN00261-4 K9 59.0 57 6 </td <td>WQC 06</td> <td>ND800</td> <td>M15</td> <td>62.0</td> <td>67</td> <td>4</td> <td>31.5</td> <td>405</td> <td>96.0</td> <td>90.0</td>	WQC 06	ND800	M15	62.0	67	4	31.5	405	96.0	90.0
WQC 09 98S0113-20 C12 58.1 53 8 26.6 388 75.5 11.7 WQC 010 98S0113-20 B12 61.4 71 3 31.4 413 89.7 44.9 WQC 011 COI320W K11 56.8 66 4 29.8 209 60.8 27.6 WQC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 339 84.9 50.3 WQC 017 MN00261-4 K9 65.7 73 4 <td></td> <td></td> <td>M12</td> <td></td> <td>58</td> <td></td> <td>30.1</td> <td>402</td> <td>79.7</td> <td>87.3</td>			M12		58		30.1	402	79.7	87.3
WQC 010 98S0113-20 B12 61.4 71 3 31.4 413 89.7 44.9 WQC 011 COI320W C11 52.2 19 25 19.0 316 70.9 7.5 WQC 012 COI320W K11 56.6 68 4 29.8 209 60.8 27.6 WQC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 014 ND805 M10 62.4 77 3 35.2 366 89.1 98.5 WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN90261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.1 85 34.5 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>30.0</td> <td>342</td> <td>88.5</td> <td>43.9</td>							30.0	342	88.5	43.9
WQC 011 COI320W C11 52.2 19 25 19.0 316 70.9 7.5 WQC 012 COI320W K11 56.6 66 4 29.8 209 60.8 27.6 WQC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 39.9 41.4 58.8 7.3 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3887 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 023 SD3887 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 36.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 36.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 36.2 422 101.5 41.7 WQC 026 MN95229-A K2 61.2 83 1 36.5 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn M8 64.2 82 4 31.3 381 106.9 97.1								388	75.9	11.7
WQC 012 COI320W K11 58.6 66 4 29.8 209 60.8 27.6 WQC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 018 CHBR1985B K6 55.7 73 4 34.5 336 72.4 30.6 WQC 018 CHBR1985B K6 55.7 73 4	WQC 010	98S0113-20	B12	61.4	71	- 3	31.4	413	89.7	44.9
WQC 013 COI320W M11 60.9 51 7 29.8 363 96.8 93.4 WQC 014 ND805 M10 62.4 77 3 35.2 386 89.1 98.5 WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 019 CHBR1985B M6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B M6 55.7 73 4 34.6 354 72.4 30.6 WQC 021 SD3687 B4 57.0 63 7							19.0	316	70.9	7.5
WQC 014 ND805 M10 62.4 77 3 35.2 366 89.1 98.5 WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 019 CHBR1985B K6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 482 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 4417 81.8 86.6 GCK Glenn B8 63.1 63 5 29.2 4417 81.8 86.6 GCK Glenn B8 63.1 63 5 29.2 4417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6									8.06	27.6
WQC 015 ND805 C10 57.4 64 6 30.1 385 99.9 4.7 WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 019 CHBR1985B K6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 M4 58.0 63 6	WQC 013	COI320W	M11	60.9	51	7	29.8	363 .	96.8	93.4
WQC 016 MN00261-4 C9 59.0 57 6 28.8 420 88.8 5.1 WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 019 CHBR1985B K6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 022 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 83.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 52 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	WQC 014	ND805	M10	62.4	77	3	35.2	386	89.1	98.5
WQC 017 MN00261-4 K9 61.1 85 1 36.0 399 84.9 50.3 WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 019 CHBR1985B K6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6	WQC 015	ND805	C10	57.4	64	6	30.1	385	99.9	4.7
WQC 018 CHBR1985B M6 61.0 68 5 34.5 396 74.4 89.3 WQC 019 CHBR1985B K6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B G6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10	WQC 016	MN00261-4	C9	59.0	57	6	- 28.8	420	88.8	5.1
WQC 019 CHBR1985B K6 55.7 73 4 34.6 354 72.4 30.6 WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1	WQC 017	MN00261-4	K9	61.1	85	1	36.0	399	84.9	50.3
WQC 020 CHBR1985B C6 52.1 31 16 23.9 414 58.8 7.3 WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5	WQC 018	CHBR1985B	M6	61.0	68	5	34.5	396	74.4	89.3
WQC 021 SD3687 B4 57.0 53 7 29.4 393 82.7 50.8 WQC 022 SD3687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 <td< td=""><td>WQC 019</td><td>CHBR1985B</td><td>K6</td><td>55.7</td><td>73</td><td>4</td><td>34.6</td><td>354</td><td>72.4</td><td>30.6</td></td<>	WQC 019	CHBR1985B	K6	55.7	73	4	34.6	354	72.4	30.6
WQC 022 SD9687 C4 54.2 49 8 28.0 388 89.9 3.5 WQC 023 SD9687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 2	WQC 020	CHBR1985B	C6	52.1	31	16	23.9	414	58.8	7.3
WQC 023 SD3687 M4 58.0 63 6 30.9 355 86.5 94.2 WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29	WQC 021	SD3687	B4	57.0	53	7 ~	29.4	393	82.7	50.8
WQC 024 ND803 M3 60.9 65 6 31.9 426 99.6 88.1 WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.	WQC 022	SD3687	C4	54.2	49	8	28.0	388	89.9	3.5
WQC 025 ND803 C3 57.8 62 6 28.4 387 88.5 6.1 WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn B8 63.1 63 5 29.2 <td>WQC 023</td> <td>SD3687</td> <td>М4</td> <td>58.0</td> <td>63</td> <td>6</td> <td>30.9</td> <td>355</td> <td>86.5</td> <td>94.2</td>	WQC 023	SD3687	М4	58.0	63	6	30.9	355	86.5	94.2
WQC 026 MN95229-A C2 58.6 39 10 26.9 446 73.9 10.0 WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2	WQC 024	ND803	ЕМ	60.9	65	6	31.9	426	99.6	88.1
WQC 027 MN95229-A K2 61.2 83 1 35.2 422 101.5 41.7 WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4	WQC 025	ND803	C3	57.8	62	6	28.4	387	88.5	6.1
WQC 028 MN95229-A M2 61.0 66 5 35.6 462 112.2 93.1 ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	WQC 026	MN95229-A	C2	58.6	39	10	26.9	446	73.9	10.0
ACK Parshall K5 59.5 73 4 32.9 397 92.0 44.3 BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	WQC 027	MN95229-A	K2	61.2	83	1	35.2	422	101,5	41.7
BCK Parshall M5 61.8 45 9 25.9 366 91.1 96.5 CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	WQC 028	MN95229-A	M2	61.0	66	5	35.6	462	112.2	93.1
CCK Parshall B5 61.3 63 5 29.1 409 99.1 86.6 DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 52 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	ACK	Parshall	K5	59.5	73	4	32.9	397	92.0	44.3
DCK Parshall C5 58.0 38 13 24.4 426 85.6 73.2 ECK Glenn M8 64.2 62 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	BCK	Parshall	M5	61.8	45	9	25.9	36 6	91.1	96.5
ECK Glenn M8 64.2 52 4 31.3 381 106.9 97.1 FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	A Committee of the Comm	Parshall	· B5	61.3	63		29.1	409		86.6
FCK Glenn B8 63.1 63 5 29.2 417 81.8 86.6 GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	DCK	Parshali	C5	58.0	38	13	24.4	426	85.6	73.2
GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	ECK	Glenn	M8	64.2	52	4	31.3	381	106.9	97.1
GCK Glenn C8 60.5 54 6 28.4 367 89.8 79.6	FCK	Glenn	88	63.1	63	5	29.2	417	81.8	86.6
	GCK	Glenn		60.5	54		28.4	367	89.8	79.6
	HCK	Glenn	KB							

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Summary of Kernel Characteristics (cont)

				Ground	LECO		
				Wheat	Wheat	Wheat	
Random			DON	Moisture	Protein	Ash	PPO
ID	Entry	ID	ppm	%	12%mb	14%mb	abs475
WQC 01	CA-902-701	K16	1.9	12.3	14.6	1.70	0.688
WQC 02	CA-902-701	C16	1.6	10.5	15.1	1.73	0.601
WQC 03	ND800	B15	0.6	10.0	15.2	1.67	0.643
WQC 04	ND800	C15	1.7	11.2	14.6	1.66	0.979
WQC 05	008QN	K15	1.9	12.4	14.3	1.76	0.728
WQC 06	ND800	M15	<0.5	11.9	14.6	1.44	0.837
WQC 07	98S0113-20	M12	<0.5	10.7	15.0	1.50	0.782
WQC 08	98S0113-20	K12	1.3	12.1	14.7	1.67	0.834
WQC 09	98S0113-20	C12	1.0	10.8	15.0	1.68	0.618
WQC 010	98S0113-20	B12	<:5	10.5	15.4	1.63	0.821
WQC 011	COI320W	C11	4.6	10.4	13.7	1.80	0.778
WQC 012	COI320W	K11	1.4	13.4	13.3	1.67	0.613
WQC 013	CO1320W	M11	0.5	11.3	13.7	1.43	0.714
	Monor			40.0	40.1	4.40	0.005
WQC 014	ND805	M10	<0.5	10.9	13.4	1.46	0.865
WQC 015	ND805	C10	8.0	11.3	14.4	1.58	1.016
WOO DIE	MN00261-4	C9	0.0	11.2	14.6	1.58	0.381
WQC 016 WQC 017	MN00261-4	K9	0.6 0.6	11.8	13.5	1.67	0.368
WQC 013	WINDOCUT	173	0.0	11.0	10.5	1.01	0.000
WQC 018	CHBR1985B	M6	0.5	10.9	15.0	1.56	0.546
WQC 019	CHBR1985B	K6	5.5	11.8	13.3	1.79	0.442
WQC 020	CHBR1985B	C6 '	4.2	10.7	15.2	1.89	0.474
., 40 020	20121110222		,,,	••••	,	7.00	
WQC 021	SD3687	B4	0.6	10.2	15.4	1.68	0.717
WQC 022	SD3687	C4	0.8	11.1	14.1	1.71	0.558
WQC 023	SD3687	M4	<0.5	10.8	13.3	1.50	0.666
WQC 024	ND803	МЗ	<0.5	11.3	14.7	1.53	0.582
WQC 025	ND803	СЗ	1.0	11.9	15.0	1.85	0.890
WQC 026	MN95229-A	C2	1.6	11.3	15.0	1.83	0.796
WQC 027	MN95229-A	K2	0.8	12.5	14.8	1.63	0.836
WQC 028	MN95229-A	M2	<0.5	11.6	15.7	1.56	0.672
							•
ACK	Parshall	K5	2.1	12.5	13.8	1.71	0.581
BCK	Parshall	M5	<0.5	11.1	13.7	1.44	0.639
CCK	Parshall	B5	0.7	10.3	15.8	1.79	0.697
DCK	Parshall	C5	1.8	11.4	14.6	1.67	0.872
ECK	Glenn	M8	<0.5	11.2	14.5	1.43	0.735
FCK	Glenn	B8	0.6	10.0	15.4	1.75	0.751
GCK	Glenn	C8	2.0	11.5	15.7	1.76	0.655
HCK	Glenn	K8	2.6	12.2	13.0	1.67	0.632

Table 8. Summary of flour characteristics of HRSW lines tested in the Wheat Quality Council Trials in 2004. Rush, CA-902-701, is entry C16, and K16.

20

Summary of Flour Characteristics

Random	**************************************	ara.	Straight Grade Flour Yield TPB*	Straight Grade Flour Yield TWB*	Straight Grade Flour per bushel wheat	Flour Moisture	Flour Ash	Flour Protein	Starch Damage
WQC 01	Entry CA-902-701	ID V	%	%	lbs	%%	14%mb	14%mb	%
WQC 02	CA-902-701		78.4	76.5	46.5	13.8	0.675	13.9	5.96
WGC 02	On-302-101	, y C16	76.7	73.4	44,1	14.0	0.619	14.2	6.56
WQC 03	ND800	B15	76.7	73.9	47.1	13.8	0.595	14.6	8.88
WQC 04	ND800	C15	77.6	74.3	44.0	13.4	0.625	13.7	7.27
WQC 05	ND800	K15	78.1	74.8	46.3	13.8	0.618	13.3	6.87
WQC 06	ND800	M15	79.6	75.5	48.5	12.9	0.545	13.9	8.23
WQC 07	98\$0113-20	M12	78.9	74.0	47.3	13.1	0.627	14.9	4.48
WQC 08	98S0113-20	K12	77.4	74.6	44.5	14.2	0.653	13.9	4.52
WQC 09	98\$0113-20	G12	77.5	73.9	44.6	13.4	0.680	14.2	4.14
WQC 010	98\$0113-20	B12	76.1	73.1	46.8	13,9	0.643	14.8	5.37
WQC 011	CO1320W	C11	77.0	74.1	40.0	14.0	0.650	12.9	5.32
WQC 012	CO1320W	K11	78.8	74.8	44.0	13.1	0.644	12.2	6.55
WQC 013	COI320W	M11	78.3	75.0	47.2	13.4	0.601	13.2	7,11
WQC 014	ND805	M10	80.7	77.1	49.8	13.3	0.572	13.0	7.07
WQC 015	ND805	C10	80.0	76.3	45.6	13.6	0.595	13.8	7.97 7.82
WQC 016	MN00261-4	C9	78.8	75.4	46.1	13.9	0.637	13.9	7.11
WQC 017	MN00261-4	K9	78.9	75.6	47.6	13.6	0.625	12.8	7.14
WQC 018	CHBR1985B	M6	78.1	73.5	46.4	12.6	0.641	14.9	4.79
WQC 019	CHBR1985B	K6	77.6	73.3	42.3	13.1	0.699	12.3	5.15
WQC 020	CHBR1985B	C6	75.5	71.4	38.4	13.0	0.773	14.7	3.94
WQC 021	SD3687	84	77.1	73.4	43.9	14.1	0.594	15.2	8.11
MOC 055	SD3687	C4	77.5	73.7	41.2	13.8	0.731	13.2	6.72
WQC 023	SD3687	M4	79.3	75.3	45.4	13.3	0.631	12.7	7.96
WQC 024	ND803	мз	79.3	75.3	47.5	12.9	0.608	14.1	7.99
WQC 025	ND803	C3	77.4	73.9	44.4	13.6	0.656	14.1	6.67
WQC 026	MN95229-A	C2	76.0	73.2	44.2	13.9	0.681	14.1	6.58
WQC 027	MN95229-A	K2	77.7	74.2	46.8	13,8	0.616	13.7	6.31
WQC 028	MN95229-A	M2	78.2	74.3	47.0	13.3	0.576	15.4	6.96
ACK	Parshall	K5	78.0	74.8	46.0	13.9	0.606	12.9	6.37
BCK	Parshall	M5	79.9	76.1	48.7	13.1	0.572	13.2	8.15
CCK	Parshall	B5	75.8	72.8	46.6	13.4	0.711	13.8	6.67
DCK	Parshall	C5	77.5	74.3	44.5	- 13.9	0.610	13.8	7.32
ECK	Glenn	M8	79.4	75.6	50.2	13.2	0.541	14.4	7.13
FCK	Glenn	B8	76.0	72.6	47.8	13.5	0.647	14.9	7.08
GCK	Glenn	C8	77.2	73.5	46.1	13.5	0.629	14.8	7.57
HCK	Glenn	K8	77.9	73.8	46.3	13,6	0.593	12.2	7.30

^{*} TBP = Total Product Basis

^{*} TWB = Tempered Wheat Basis

CA-902-701

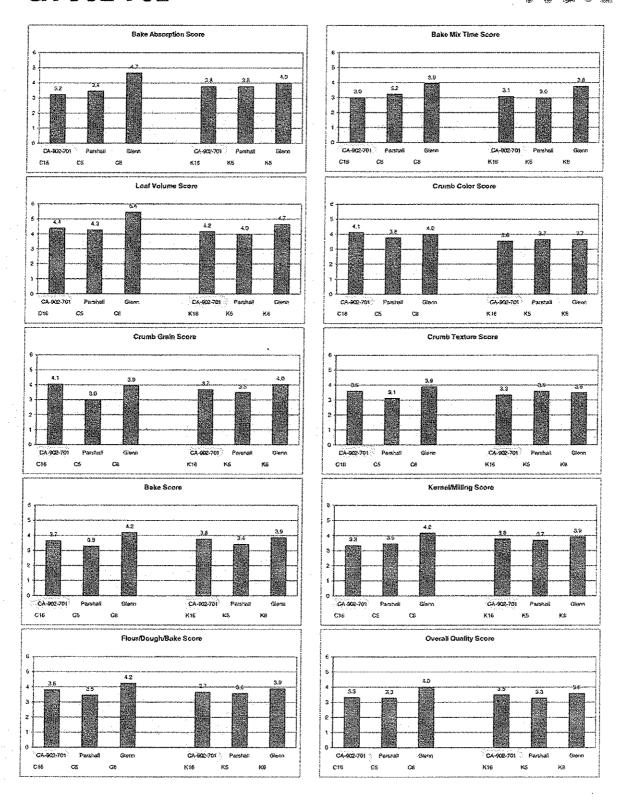


Figure 1. Summary of baking and milling scores of Rush, CA-902-701, and high quality checks tested in the Wheat Quality Council Trials in 2004. Higher scores indicate higher quality.

Table 9. Comparison of Rush and Granite for agronomic, quality and disease characteristics in ND, SD and MN in 2004 and 2005.

Variety	n	Yield -bu/a-	Test Weight -lbs/bu-	Heading -days from 6-1-	Height -cm-	Protein -%-	Sed -mm-	VSK ¹ -%-
2005 Gary, MN		.I						1
Rush	4	71.54	59.1	25.3	78.7	14.9	99	3.7
Granite	4	74.46	59.7	30.0	78.7	16.0	96	16.0
2005 Valley City, ND								
Rush	4	41.30	60.6	26.5	74.3	15.1	93	1.7
Granite	4	35.37	59.3	32.0	74.3	15.4	90	3.3
2005 Bristol, SD								
Rush	4	64.03	60.3	17.5	-	15.0	108	2.7
Granite	4	46.88	55.9	23.3	-	15.7	97	25.0
2005 Casselton, ND D	emo						1	
Rush	1	66.6	58.9	_	-	15.2	96	0.5
Granite	1	64.6	59.6	-	-	16.6	95	6.2
2005 Casselton, ND Yi	eld							
Rush	3	58.2	61.0	26.7	88.1	14.8	107	2.3
Granite	3	59.7	61.4	32.0	82.1	15.2	105	3.0
2005 Belfield, ND			<u>i</u>					
Rush	4	64.96	63.4	23.8	83.3	14.4	99	-
Granite	4	62.31	64.1	29.8	83.2	14.7	94	-
2005 Steele, ND Fungi	 cide		l i					
Rush	4	51.2	59.9	26.0	81.3	15.7	94	1.0
Granite	4	50.1	60.8	31.5	81.3	16.7	95	4.7
2005 Steele, ND								
Rush	4	45.2	60.1	25.5	81.3	15.5	97	2.3
Granite	4	39.7	59.6	32.0	81.3	17.0	96	6.3
2005 Felton, MN Fungi	 cide		<u> </u>					
Rush	4	58.6	60.4	26.5	80.0	14.9	109	2.0
Granite	4	73.1	61.2	31.0	78.7	16.3	104	2.0
2005 Felton, MN		•						
Rush	4	63.1	60.0	26.0	81.3	14.4	111	2.7
Granite	4	74.2	61.8	31.5	80.0	16.1	103	3.0
2005 DGP - 6 locations								!
Rush	23	55.4	61.8	30.2	79.1	15.1	94.5	2.4
Granite	23	55.1	62.0	35.2	79.3	14.7	82.0	5.7

Table 9. Comparison of Rush and Granite(continued)

Variety	n_	Yield -bu/a-	Test Weight -lbs/bu-	Heading -days from 6-1-	Height -cm-	Protein -%-	Sed -mm-	VSK ¹ -%-
2005 Ross Seed - 5 loca	tions							
Rush		50.2	60.5	26.2		16.1	105.4	2.2
	14		60.5	26.2	-	16.1	105.4	2.2
Granite	14	53.2	62.1	31.0	-	16.0	98.0	2.7
2004 DGP - 6 locations		1	+				J	
Rush	20	73.1	62.7	39.2	83.7	15.0	113.2	_
Granite	20	77.8	63.2	44.5	83.3	15.3	100.0	_
2004 Ross Seed - 3 loca	tione							
Rush	9	49.3	62.5	39.2	84.7	14.0	109.3	1.5
Granite	9	59.9	63.7	45.3	81.6	13.7	94.7	1.7
Granite		39.9	03.7	40.0	01.0	13.7	34.1	1.7
2004 Steele, ND, with Fu	ıngicide							
Rush	4	30.4	60.6	31.0	86.4	13.6	•	0.0
Granite	4	33.9	60.4	37.8	78.7	13.6	-	5.4
2004 Steele, ND								
Rush	4	39.2	61.0	32.0	88.9	15.2	-	0.0
Granite	4	43.5	61.6	37.5	88.9	14.9	-	3.2
2004 West Fargo, ND wit	th Fungic	ide:						
Rush	4	63.0	63.4	27.5	90.2	15.8	110	1.9
Granite	4	76.2	64.3	33.0	89.5	15.8	97	2.6
O TO THE O		70.2	1 1.0	00.0	00.0	10.0		
2004 West Fargo, ND								
Rush	4	66.1	62.3	27.0	89.5	15.3	105	0.0
Granite	4	76.5	64.1	32.0	90.2	15.0	90	2.3
2004 Casselton, ND		J.						
Rush	3	78.1	63.3	23.7	96.5	14.9	110.0	0.7
Granite	3	75.7	64.4	29.7	94.0	14.2	88.0	1.3
Overall Average								
Rush	121	57.3	61.1	27.8	84.2	15.0	103.6	1.6
Granite	121	57.3 59.6	61.5	33.3	82.8	15.4	95.6	5.5
Jianile .	141	0.80	01.0	33.3	02.0	10.4	0.08	<u> </u>
ANOV F statistic significant at P<0.0001				***			***	***

¹ VSK = visually scabby kernels.

Exhibit B. Statement of Distinctness

Rush is most similar to the hard red spring wheat variety Granite. However, Rush can be distinguished from Granite by three distinct morphological characteristics, glume beak shape, glume color and juvenile plant growth habit.

- 1. Rush has tan glumes at maturity while Granite has white glumes.
- 2. Rush has long acuminate beaks and Granite has short obtuse beaks (see Figure 2).
- 3. Rush has an erect juvenile plant growth habit and Granite has a semi-erect juvenile plant growth habit.

Granite Rush

Figure 2. Glumes of Granite with short obtuse beaks on left and glumes of Rush with long acuminate beaks on right.

KEPROQUCE LOCALLY. Include form number and date on all reproductions.

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> U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY PLANT VARIETY PROTECTION OFFICE BELTSVILLE, MD 20705

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY

	Wheat (<i>Triticum</i> spp.)	
NAME OF APPLICANT (S) WestBred, LLC	TEMPORARY OR EXPERIMENTAL DESIGNATION CA-902-701	VARIETY NAME Rush
ADDRESS (Street and No. or RD No., City, State, Zip Code and Cod	untry)	FOR OFFICIAL USE ONLY
81 Timberline Drive	•	PVPO NUMBER
Bozeman, MT 59718-8184		200600282
PLEASE READ ALL INSTRUCTIONS CAREFULLY:		
should be determined from varieties entered in the sai	vely. Data for quantitative plant characters should be me trial. Royal Horticultural Society or any recognize	e a zero in the first box (e.g., 0 9 9 or 0 9) based on a minimum of 100 plants. Comparative data d color standard may be used to determine plant colors r your variety; lack of response may delay progress of
1. KIND: 1 = Common 2 = Durum 3 = Club 4 = Other (Specify)		
3. COLEOPTILE ANTHOCYANIN: 1 = Absent 2 = Present	4. JUVENILE PLANT 1 = Pros	
5. PLANT COLOR: (boot stage) 1 = Yellow-Green 2 = Green 3 = Blue-Green	6. FLAG LEAF: (boots 1	2 = Recurved wisted 2 = Twisted
7. EAR EMERGENCE: 0 4 4 Number of Days (Average) 0 5 Number of Days Earlier Than * Same As * Number of Days Later Than * *Re	Granite elative to a PVPO-Approved Commercial Variety Grou	wn in the Same Trial
3. ANTHER COLOR: 1 1 = Yellow 2 = Purple		<u>.</u>

9. PLANT HEIGHT: (from soil to top of head, excluding awns) 0 8 5 cm (Average) Granite	200600282
O I cm Taller Than Granite Same As cm Shorter Than	*
10. STEM:	
A. ANTHOCYANIN 1 = Absent 2 = Present	D. INTERNODE 1 1 = Hollow 2 = Semi-Solid 3 = Solid Number of Nodes
B. WAXY BLOOM 2 1 = Absent 2 = Present	E. PEDUNCLE 1 1 = Erect 2 = Recurved 3 = Semi-Erect 3 5 cm Length
C. HAIRINESS (last internode of rachis) 1 = Absent 2 = Present	F. AURICLE 1 Anthocyanin: 1 = Absent 2 = Present 2 Hair: 1 = Absent 2 = Present
1. HEAD: (At Maturity)	
A. DENSITY 1 = Lax 2 = Middense (Laxidense) 3 = Dense	C. CURVATURE 1 = Erect 2 = Inclined 3 = Recurved
B. SHAPE 1 = Tapering 2 = Strap 3 = Clavate 4 = Other (Specify) Oblong	D. AWNEDNESS 1 = Awniess 2 = Apically Awnietted 3 = Awnietted 4 = Awned
2. GLUMES: (At Maturity)	
A COLOR 1 = White 2 = Tan 3 = Other (Specify)	E. BEAK WIDTH 1 = Narrow 2 = Medium 3 = Wide
B. SHOULDER 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate 7 = Other (Specify)	F. GLUME LENGTH 2 1 = Short (ca. 7 mm) 2 = Medium (ca. 8 mm) 3 = Long (ca. 9 mm)
C. SHOULDER WIDTH 1 = Narrow 2 = Medium 3 = Wide	G. WIDTH 1 = Narrow (ca. 3 mm) 2 = Medium (ca. 3.5 mm) 3 = Wide (ca. 4 mm)
D. BEAK 1 = Obtuse 2 = Acute 3 = Acuminate	H. PUBESCENCE 1 = Not Present 2 = Present

13. SE	EED:		
A.	. SHAPE	e. color 200600282	
1	1 = Ovate 2 = Oval 3 = Elliptical	1 = White 2 = Amber 3 = Red 4 = Other (Specify)	
В.	CHEEK	F. TEXTURE	
2	1 = Rounded 2 = Angular	1 = Hard 2 = Soft 3 = Other (Specify)	
C.	BRUSH	G. PHENOL REACTION (See Instructions)	
1	1 = Short	1 = Ivory 4 = Dark Brown 2 = Fawn 5 = Black 3 = Light Brown	
, D .	CREASE	H. SEED WEIGHT	
1	1 = Width 60% or less of Kernel 2 = Width 80% or less of Kernel 3 = Width Nearly as Wide as Kernel	3 4 g/1000 Seed (whole number only)	
П	1 = Depth 20% or less of Kernel	I. GERM SIZE	
1	2 = Depth 35% or less of Kernel 3 = Depth 50% or less of Kernel	2 1 = Small 2 = Midsize 3 = Large	-
14. DIS	EASE: PLEASE INDICATE THE SPECIFIC RACE OR STRA	RAIN TESTED	
	(0 = Not Tested 1 = Susceptible	2 = Resistant 3 = Intermediate 4 = Tolerant)	
	Stem Rust (Puccinia graminis f. sp. tritici)	2 Leaf Rust (<i>Puccinia recondita</i> f. sp. <i>tritici</i>)	
1	Stripe Rust (Puccinia striiformis)	O Loose Smut (Ustilago tritici)	
	Tan Spot (Pyrenophora tritici-repentis)	Flag Smut (Urocystis agropyri)	
	Halo Spot (Selenophoma donacis)	Common Bunt (<i>Tilletia tritici</i> or T. <i>laevis</i>)	
	Septoria nodorum (Glume Blotch)	Dwarf Bunt (Tilletia controversa)	
	Septoria avenae (Speckled Leaf Disease)	O Karnal Bunt (<i>Tilletia indica</i>)	
O Septoria tritici (Speckled Leaf Blotch) O Powdery Mildew (Erysiphe		O Powdery Mildew (Erysiphe graminis f. sp. tritici)	
3	3 Scab (Fusarium spp.) © "Snow Molds"		
	"Black Point" (Kernel Smudge) O Common Root Rot (Fusarium, Cochliobolus and Bipolaris spp.)		
0	Barley Yellow Dwarf Virus (BYDV)	O Rhizoctonia Root Rot (Rhizoctonia solani)	
0	Soilborne Mosaic Virus (SBMV)	Black Chaff (Xanthomonas campestris pv. translucens).	
	Wheat Yellow (Spindle Streak) Mosaic Virus	Bacterial Leaf Blight (Pseudomonas syringae pv. syringae)	
0	Wheat Streak Mosaic Virus (WSMV)	Other (Specify)	
	Other (Specify)	Other (Specify)	
	Other (Specify)	Other (Specify)	
	Other (Specify)	Other (Specify)	
5. INSE	·	,	
		CIFY BIOTYPE (where needed)	
	Hessian Fly (Mayetiola destructor)	Other (Specify)	
0	Stem Sawfly (Cephus spp.)	Other (Specify)	
0	Cereal Leaf Beetle (Oulema melanopa)	Other (Specify)	ファ

Exhibit C (Wheat)

15.	INSECT: (continued)	(0 = Not Tested	1 = Susceptible	2 = Resistant	3 = Intermediate	4 = Tolerant)	
	O Russian Aphid (Di O Greenbug (Schiza O Aphids		PLEASE S	Other ((Where Needed) Specify) Specify) Specify)	20060028	32

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

REPRODUCE LOCALLY. Include form number and edition date on all	I reproductions.	ORM APPROVED - OMB No. 0581-0055	
U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE EXHIBIT E	Application is required in order to dete certificate is to be issued (7 U.S.C. 24 confidential until the certificate is issue	(21). The information is held	
STATEMENT OF THE BASIS OF OWNERSHIP			
1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME	
WestBred, LLC	CA-902-701	Rush	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)	5. TELEPHONE (Include area code)	6. FAX (Include area code)	
81 Timberline Dr.	(406) 587-1218	(406) 586-8247	
Bozeman, MT 59718-8184	7. PVPO NUMBER		
	200600282		
8. Does the applicant own all rights to the variety? Mark an "X" in the	e appropriate biоск. I f no, piease expia .	in. YES NO	
9. Is the applicant (individual or company) a U.S. national or a U.S. b	pased company? If no, give name of co	ountry. YES NO	
10. Is the applicant the original owner? YES	NO If no, please answer one	of the following:	
a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. Nationa NO If no, give name of count	* *	
	5.4		
b. If the original rights to variety were owned by a company(ies), YES	NO If no, give name of country	· · · · · · · · · · · · · · · · · · ·	
11. Additional explanation on ownership (Trace ownership from origin	nal breeder to current owner. Use the re	verse for extra space if needed):	
PLEASE NOTE:			
Plant variety protection can only be afforded to the owners (not licens	ees) who meet the following criteria:		
If the rights to the variety are owned by the original breeder, that penational of a country which affords similar protection to nationals of			
If the rights to the variety are owned by the company which employ nationals of a UPOV member country, or owned by nationals of a c genus and species.			
3. If the applicant is an owner who is not the original owner, both the o	original owner and the applicant must me	eet one of the above criteria.	
The original breeder/owner may be the individual or company who din Act for definitions.	ected the final breeding. See Section 4	(a)(2) of the Plant Variety Protection	
According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, a control number. The valid OMB control number for this information collection is 0581-0055, including the time for reviewing the instructions, searching existing data sources, gathering at	The time required to complete this information collect	ion is estimated to average 0.1 hour per response,	
The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and ac marital or family status, political beliefs, parental status, or protected genetic information. (No communication of program information (Braille, large print, audiotape, etc.) should contact US	ot all prohibited bases apply to all programs.) Person	s with disabilities who require alternative means for	

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provide and employer.

Coording to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid NMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 5 minutes per response, including the time for reviewing instructions, earching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

'he U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, olitical beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information 3 raille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

o file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD) ISDA is an equal opportunity provider and employer.

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY **PLANT VARIETY PROTECTION OFFICE** BELTSVILLE, MD 20705

EXHIBIT F DECLARATION RECAPDING DEPOSIT

NAME OF OWNER (S)	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country)	TEMPORARY OR EXPERIMENTAL DESIGNATION	
WestBred, LLC	81 Timberline Dr.	CA-902-701	
	Bozeman, MT 59718	VARIETY NAME Rush	
NAME OF OWNER REPRESENTATIVE (S) Dr. Greg Fox	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) 81 Timberline Dr. Bozeman, MT 59718	PVPO NUMBER 2006 0 0 2 8 2	

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.

August 15, 2006